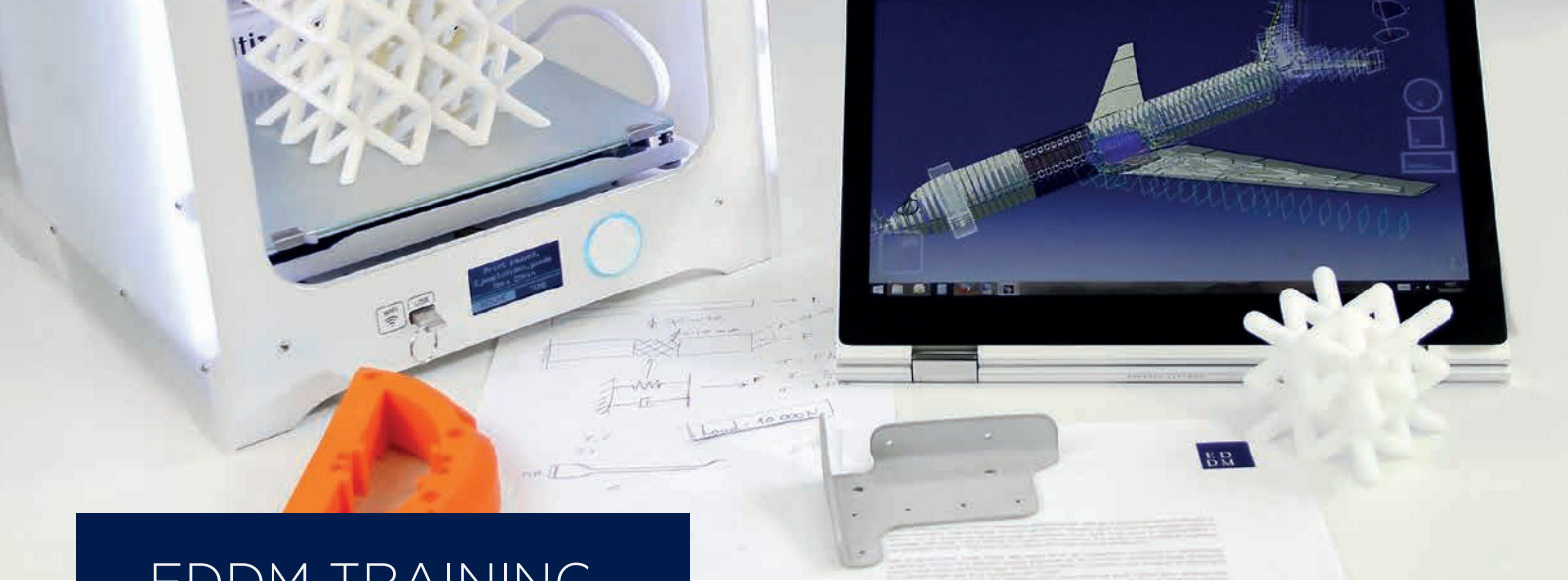




MASTER IN AEROSPACE  
STRUCTURAL ANALYSIS  
**MECEA**

ED  
DM

TRAINING



## EDDM TRAINING

Leading institution in the teaching of technical disciplines, it bases its training proposal on an innovative and methodology, 100% practical adjusted to the evolution of technologies and the current professional context.

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**EDDM Training is a school whose mission is the superior training of engineers and technicians, turning them into qualified professionals with projection in the field of aeronautical engineering.**

Founded by professionals with extensive experience in aerospace engineering and in the field of additive manufacturing and professional 3D printing, it has in the development of its training program, the collaboration of important companies in the sector and public institutions such as the Aeronautical Cluster of Madrid, the Madri+d Foundation and the Spanish Association of Additive Manufacturing Technologies and 3D (ADDIMAT).

The teaching staff has more than 50 professionals from companies in the aeronautical sector, such as the National Institute of Aerospace Technology (INTA), AIRBUS, ITP, ALESTIS, ACITURRI, RYMSA, ALTRAN, etc.

EDDM Training is committed to a training model very close to the real work environment, establishing strategic agreements with companies in the sector to train their students according to the real needs of the market. Only in this way is it possible to succeed in job incorporations and professional projection.

*"With the accumulated experience and the contrasted methodology in the development of the MEDMA and MIFA masters, the MECEA Aerospace Structures Calculation Master is a very useful training with which your students can make a difference in a sector such as the aeronautical, whose requirements and quality standards are extremely demanding."*

**ENRIQUE GÓMEZ LLORENA**

Deputy manager. Aerospace Cluster of Madrid

# MASTER IN AEROSPACE STRUCTURAL ANALYSIS MECEA

Master in the analysis of aerospace structures with a 100% practical character that transmits to its students technical and practical knowledge that is only obtained after years of work experience thanks to his innovative study methodology.

Currently the aerospace sector has an important barrier of entry for engineers without extensive experience. The Master in Aerospace Structures Calculation MECEA helps its students to overcome this barrier with specific training in knowledge and techniques that are directly applied in a real working environment.

The MASTER IN AEROSPACE STRUCTURAL ANALYSIS is a program with a teaching team formed by highly qualified professionals with years of experience in the aeronautical, space and defense sector; In addition, thanks to the work methodology implemented in 2013 in the MEDMA and now adapted to the MECEA, the students are perfectly qualified to perform engineering works of calculation in a completely autonomous way from the first day they enter the labor market thanks to the 12 months of professional practices that are guaranteed.



## EXCLUSIVETRAINING PROGRAMME

Unlike the traditional courses of calculation of finite elements, MECEA offers a training oriented to the **real work of a analyst**.



## EXPERT TEACHING STAFF

Professionals with proven technical experience in key projects in the aeronautical sector.



## RECREATION OF REAL WORKING ENVIRONMENT

Training based on the work methodology of companies in the sector with real practical cases and standardized **FEM software such as NASTRAN and Hyperworks**.



## 1 YEAR GUARANTEED INTERNSHIP

The master offers an actual possibility to begin working in an inaccessible sector at present for inexperienced profiles.

# MECEA PROGRAMME

## DURATION

9 months / 600 hours  
+ 12 paid internship

## SCHEDULE

October to June  
Monday to Thursday  
5:30 pm - 10:00 pm

## STUDENT PROFILE

- › Newly graduated engineers without experience
- › Engineers with experience in other sectors and interest in joining the aerospace sector in the area of structural analysis
- › Professionals from the aerospace sector interested in recycling from other areas towards structural analysis

## 01

### INTRODUCTION TO AEROSPACE STRUCTURAL ANALYSIS

Introduction to the discipline of structural calculation in the aeronautical and space sector.

- › Introduction to the aeronautical and space sector
- › General concepts in structural analysis
- › Functional requirements and certification
- › Aeronautical structure loads

## 02

### AERONAUTICAL MATERIALS AND MANUFACTURING TECHNOLOGIES

Detailed description of the most used materials in aeronautics and space. Simulation modes and particularities of each type.

- › Material characterization
- › Metallic materials
- › Polymers
- › Composite materials
  - › Manufacturing methods
  - › Rheological methods
  - › Failure modes
  - › Applicability
  - › Simulation techniques

## 03

### ANALYSIS AND TESTS OF AERONAUTICAL STRUCTURES

Content focused on the understanding of the two large blocks of simulation of structures: analytical and numerical methods and real tests.

- › Finite elements method Simulation of structures
  - › Discretization
  - › Pre and post processes
  - › Modeling
  - › From GFEM to DFEM: technique & execution
  - › Geometric quality checks
  - › Computational checks
  - › Convergence analysis
- › Structural Tests
  - › Part Tests
  - › Structural Tests
  - › Non destructives Tests

## 04

### ADVANCED STRUCTURAL ANALYSIS

Engineer training to carry out the analysis and sizing of all the components of an airplane.

- › Aeronautical Structure Analysis
  - › Principal and subparts of an airplane
  - › Basic Requirements
  - › Concept of failure mode & calculation methods
  - › Calculation results
- › Sizing elements
  - › Skin
  - › Frames / Stringers
  - › Fittings / smaller components
  - › Riveted joints
  - › Screwed joints
  - › Adhesive bonds
  - › Welded joints
  - › Joint simulation methods
- › Structural repairs

## 05

### FATIGUE AND DAMAGE TOLERANCE

In-depth analysis of fatigue and tolerance to damage in aeronautics and space. Detection and prevention modes.

- › Introduction to fatigue and damage tolerance
- › Fatigue design
- › Stress concentrator factors
- › High Cycle Factor (HCF)
- › Low Cycle Factors (LCF)
- › FEM methods applied to fatigue
- › Multiaxial fatigue
- › Fatigue in Composite materials
- › Inspection methods
- › Preventive methods

## 06

### INTRODUCTION TO AEROSPACE SYSTEMS

Content focused on the work methodology of the space sector. Development of specific calculation techniques.

- › Type of structures
- › Charge sources in aerospace structures
- › Modeling of aerospace systems. Design techniques
- › Analysis of aerospace systems
- › Failure in aerospace systems

## 07

### AERONAUTICAL DESIGN-ORIENTED STRUCTURAL ANALYSIS

Seminars with a 100% practical approach to the design knowledge that a calculation engineer should know.

- › CAD Design for structural analysis
- › Product configuration
- › Document management
- › States of product maturity
- › 3D Printing Design. Topologic optimization

## METHODOLOGY

### RECREATION OF THE ACTUAL WORKING ENVIRONMENT

The MECEA is conceived as a training program that in addition to teaching in detail the FEM tools of the sector enables its students to be totally autonomous when it comes to making calculations. These will be able to make decisions with criteria based on both simulations and analytical calculations supported by the theory of the main references of the sector. They will also be able to interpret the results of structural tests and correlate them with the simulations.

- › Electronic model of an aircraft developed by EDDM
- › Tools and computer applications used in the main current aeronautical projects (NASTRAN, Hyperworks)
- › Realization of structural tests on pieces manufactured in the classroom and correlation with the numerical calculations



#### AND ALSO

- › FACTORY TOURS
- › CONTACT WITH THE FINISHED MANUFACTURED PRODUCT
- › LECTURES FROM PROMINENT AREA MANAGERS

## PROFESSIONAL INTERNSHIPS

### 1 YEAR GUARANTEED WORK INTERNSHIPS

The MASTER IN AEROSPACE STRUCTURAL ANALYSIS, MECEA offers the real possibility of working in an inaccessible sector at present for inexperienced profiles.

As a culmination of the work developed throughout the master's degree, we guarantee all students a one-year paid internship in leading companies in the aeronautical sector, developing work related to the area of structural calculation.

# TEACHING STAFF

Every member in the teaching staff of MECEA have vast experience, and presently occupy positions in important aeronautical and space companies developing tasks related to the subject they teach.

MASTER DIRECTOR

## FERNANDO CABRERIZO

Head of Mechanical Characterization Laboratory of Composite Materials. **INTA**

## ELOY TEMBRÁS FRANCO

Head of Engineering Applications.  
**Altair**

## BALFOUR LAMBERT

Expert in fatigue.  
**Sogeclair Aerospace**

## EDUARDO LAPEÑA ANTÓN

Space Engineer.  
**RYMSA**

## PABLO PFLUEGER TEJERO

Senior engineer of structural calculation.  
**GDC Engineering GmbH**

## ANTONIO ALCÓN SÁNCHEZ

Head of Cabin & Cargo Hold.  
**Airbus Defence & Space**

## JOSÉ JAVIER LORENZO CORA

Senior engineer of structural calculation.  
**Altair**

## FELIX LÓPEZ MARTINEZ

Technical director and senior calculator.  
**Sogeclair Aerospace**

## IRENE VALADÉS

Team Leader Analyst.  
**Sogeclair**

## SERGIO GIL GONZÁLEZ

Section Chief 19.1 on the A350 XBW.  
**Alestis**

## SANTIAGO MARTÍN IGLESIAS

Head of additive engineering and prototypes of the Subdirectorate General of Space Systems. **INTA**

## JUAN RAMÓN LAGO MATÍAS

Structural engineer.  
**Airbus Defence & Space**

## ALFONSO DENIA ALONSO

Design Engineer and Director.  
**Adática Engineering**

See all of the teachers at [eddm.es](http://eddm.es)



"Facing the real work environment, after academic training, with success and productivity, has always been one of the demands of the most specialized industrialized sectors. This demand becomes a necessity when the specialization increases. With the MECEA, an existing barrier between the academic aeronautical calculator and the development office specialist demanded by the sector is broken. Training as an aeronautical calculation engineer from the first day of work is our goal, not only in the use of FEM software, but more importantly, in the application of industrial methodology and professional technical criteria. "

### FERNANDO CABRERIZO - DIRECTOR MECEA

Director of the Master in Aerospace Structures Calculation, MECEA  
Head of the Mechanical Characterization Laboratory of Composite Materials. INTA



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